

C1  
cont

33. (Previously Presented) The method of claim 31 further comprising the method of separating said main leaf spring from said load plate under empty payload conditions with an intermediary member.

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### REMARKS

This is a response to the Office Action dated May 30, 2003 and the Advisory Action mailed August 28, 2003. Claims 1-21 and 31-33 are pending in the application.

In the Office Action, the Examiner objected to Claims 4 and 15 as having informalities. In addition, Claims 4 and 15 were rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Further, Claims 1, 2, 4, 5, 7, 8, 10, 12, 13, 15, 16, 18, 20, and 31-33 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,750,718 ("Nickel"). Also, Claims 1-4, 7, 9, 10, 12-15, 19, 20, 31, and 32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. No. 4,345,749 ("Hellwig") in view of Nickel. Additionally, Claims 2, 9, 14, and 19 were rejected under § 103(a) in light of Nickel. Next, Claims 6 and 17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nickel in view of U.S. Pat. No. 3,904,300 ("Hetmann"). Finally, Claims 11 and 21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Nickel in light of U.S. Pat. No. 4,801,129 ("Wells").

Applicant then responded to the Office Action with an amendment filed on July 30, 2003. In that response, Claims 4 and 15 were amended. Applicant then traversed the remaining rejections from the Office Action of May 30, 2003.

In the Advisory Action mailed August 28, 2003 the Examiner withdrew the claim objections and the 35 U.S.C. § 112 rejections of Claims 4 and 15. Additionally, the Examiner withdrew all rejections based upon the Hellman reference. The rejections withdrawn included the § 103(a) rejections of Claims 1-4, 7, 9, 10, 12-15, 19, 20, 31 and 32.

Claims 1, 2, 4, 5, 7, 8, 10, 12, 13, 15, 16, 18, 20, and 31-33 remain rejected under 35 U.S.C. § 102(b) as being anticipated by Nickel. Additionally, Claims 3, 9, 14, and 19 remain rejected under 35 U.S.C. § 103(a) as being unpatentable over Nickel. Furthermore, Claims 6 and 17 continue to be rejected under 35 U.S.C. § 103(a) as being obvious in light Nickel in view of Hetmann. Finally, Claims 11 and 21 remain rejected under 35 U.S.C. § 103(a) as being unpatentable over Nickel in view of Wells.

Applicant would like to thank the Examiner for the telephonic interview conducted on October 28, 2003. During the interview, the Examiner and Applicants discussed the pending rejections based on Nickel. Applicants agreed to amend the claims to better describe how the main leaf spring directly interacts with the load spring.

With this response, Applicants have amended Claims 12 and 31 in light of the interview of October 28, 2003. Additionally, Applicants have amended Claim 15 to correct a typographical error. Applicants believe these amendments point out and distinctly claim the subject matter and are in allowable form. Additionally, Applicant traverses the remaining rejections. No new matter has been added.

**I. 35 U.S.C. § 102(b)—The Nickel Patent**

**a. Independent Claim 1**

Independent Claim 1 remains rejected as being anticipated by Nickel. Claim 1 relates to a variable rate multi-arc leaf spring. The assembly includes a main leaf spring that is constructed of a composite material. The main leaf spring defines an upwardly curved central arc having a first radius and at least one pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius. The main leaf spring provides a continuous variable spring deformation rate including a soft spring rate and a hard spring rate.

In contrast, Nickel discloses a dual rate spring construction including a main leaf spring 1 and a secondary leaf spring 2. (Col. 2, ll. 26-30). The main leaf spring 1 of Nickel has end portions that are curved upwardly. (Col. 2, ll. 30-31). Nickel, however, does not teach or suggest a curved central arc portion. In fact, in Fig. 1, Nickel discloses that the center portion of main spring 1 is completely straight up to the elastometric pads 6. Only after the elastometric pads 6 does the main leaf in Nickel begin to curve upwardly (Col. 2, ll. 30-31). Therefore, Applicant submits that the center portion of main spring 1 of Nickel is straight, and, by definition, cannot be a curved central arc portion having a first radius.

As a result, Applicants respectfully submit that Nickel does not teach every element of Claim 1, namely a main leaf spring having an upwardly curved central arc portion having a first radius. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection of independent Claim 1.

**b. Dependent Claims 2, 4, 5, 7, 8, and 10.**

Claims 2, 4, 5, 7, 8, and 10 are rejected under 35 U.S.C. § 102(b). However, these claims are dependent on Claim 1. Therefore, these claims contain all the elements of Claim 1 and only add additional elements. As a result, Nickel does not contain all the elements of these claims for the same reasons discussed for Claim 1. Applicants respectfully request that the Examiner withdraw the rejection of dependent Claims 2, 4, 5, 7, 8, and 10.

**c. Independent Claim 12**

Independent Claim 12 also stands rejected as being anticipated by Nickel. Claim 12 relates to a variable rate multi-arc leaf spring assembly. The assembly includes a main leaf spring that is constructed of a composite material. In the absence of any load, the main leaf spring defines an upwardly curved central arc portion having a first radius and at least one pair of upwardly curved peripheral arc portions extending from the center arc portion and having radii not equal to the first radius. Under load conditions, the main leaf spring provides a continuous variable spring deformation rate including a soft spring rate and a hard spring rate. The assembly further includes a load plate mounted beneath the main spring and which contacts the main spring when an increased load is applied to the main leaf spring.

In light of the interview of October 28, 2003, Applicants have amended Claim 12 to better describe the interaction between the load plate and the main spring. Applicants have added the language that load plate is "for direct contact with said main leaf spring when an increased load is applied to said main leaf spring, wherein the contact length between said main leaf spring and said load plate increases when said increased load is

applied.” Applicant believes this amendment more clearly indicates that the length of the load plate in direct contact with the main leaf increases when a load is applied.

Conversely, Nickel teaches a system in which the secondary spring 2 contains elastometric pads 6, which, in normal load conditions, “will be spaced out of contact with the lower surface of the main spring 1.” (Col. 2, ll. 50-56). Then, when a load is applied, Nickel teaches that the elastometric pads 6 will come in contact with the main spring 1. (col. 3, ll. 42-45). As a result, the main spring and secondary spring in Nickel never come into direct contact with each other when an increased load is applied. Additionally, as the main spring 1 and secondary spring 2 never come into direct contact with each other, there is no contact length between the main spring 1 and the secondary spring 2. Finally, because there is no contact length, the contact length cannot increase when an increased payload is applied to the main spring 1, unlike amended Claim 12, which claims a load plate mounted beneath the main leaf spring for direct contact with the leaf spring when an increased load is applied to the main leaf spring, wherein the contact length between said main leaf spring and the load plate increases when the increased payload is applied.

Therefore, Applicants respectfully submit that Nickel fails to teach every element of amended independent Claim 12. Accordingly, Applicants request that the Examiner withdraw this rejection of independent Claim 12.

**d. Dependent Claims 13, 15, 16, 18, and 20**

Dependent Claims 13, 15, 16, 18, and 20 were rejected as being anticipated by Nickel. These claims all depend, directly or indirectly, on amended Claim 12. Therefore, Claims 13, 15, 16, 18, and 20 should be allowed for at least the same reasons as set forth for the independent Claim 12.

Accordingly, Applicants request that the Examiner withdraw the rejections of dependent Claims 13, 15, 16, 18, and 20.

**e. Independent Claim 31**

Independent Claim 31 was rejected as being anticipated by Nickel. Claim 31 relates to a method of achieving a continuous non-linear variable spring deformation rate for a multi-arc leaf spring assembly.

By this response, Applicants have amended Claim 31 to include that the main leaf spring flexes, "and directly contacts said load plate so that the contact length between said main leaf spring and said load plate increases." Similar to Claim 12, Applicant believes that this amendment better describes the interaction between the load plate and the main leaf spring.

Therefore, in light of the amendment, Applicants respectfully submit that Nickel fails to teach each and every element of Claim 31. More specifically, Claim 31 states that the main leaf spring directly contact the load plate. Conversely, Nickel teaches that when a load is applied, the elastometric pads 6 come into contact with the main spring 1. Furthermore, in Claim 31, the main leaf spring contacts the load plate so that the contact length increases when the downward force is applied. However, because the main spring 1 in Nickel never contacts the secondary spring, no contact length exists between the main spring 1 and the secondary spring 2. As a result, Nickel does not anticipate amended Claim 31.

Accordingly, Applicants request that the Examiner withdraw this rejection of Claim 31.

**f. Dependent Claims 32 and 33**

Finally, dependent Claims 32 and 33 were rejected as being anticipated by Nickel. These claims are dependent on amended Claim 31 and should be allowed for the reasons articulated for Claim 31.

Therefore, Applicants respectfully request that Claims 32 and 33 be allowed.

**II. 35 U.S.C. § 103(a)—The Nickel Patent**

**a. Dependent Claims 3, 9, 14, and 19**

Claims 3, 9, 14, and 19 continue to be rejected under 35 U.S.C. 103(a) as being unpatentable over Nickel. Claims 3 and 9 are dependent on Claim 1. Additionally, Claims 14 and 19 are dependent on Claim 12. Therefore, as stated above for independent Claims 1 and 12, Nickel does not disclose an upwardly curved central arc portion. The main leaf spring in Nickel actually has a straight center portion which is not a curved central arc portion. Additionally, as discussed for amended Claim 12, Nickel does not disclose the contact length between said main leaf spring and said load plate increasing to achieve an enhanced soft spring rate as required by both Claims 14 and 19. Therefore, Claims 3, 9, 14, and 19 are not obvious in light of Nickel.

**III. 35 U.S.C. § 103(a)—The Nickel and Hetmann Patents**

**a. Dependent Claim 6**

The Examiner rejected dependent Claim 6 as being obvious over Nickel in view of Hetmann. Claim 6 is dependent on Claim 5 which is dependent on Claim 4. Claim 4 is further dependent on Claim 1. Therefore, Claim 6 encompasses all the elements of Claims 1, 4, and 5. Claim 6 discloses a variable multi-arc leaf spring assembly

comprising a main leaf including a continuous non-linear spring deformation rate including at least one integral mounting end connected with said at least one peripheral arc portion. The at least one integral mounting end further includes a mounting eyelet including a metallic insert for installation.

Neither Nickel nor Hetmann discloses the element of an upwardly curved central arc portion. In fact, as argued for Claim 1, the central portion of Nickel includes straight sections which only curve at the ends. Similarly, Hetman fails to disclose the upwardly curved central arc portion. Hetmann describes an elastic joint for use with steering linkages. (Col. 1, ll. 7-13.) Hetmann does not describe a leaf spring at all, let alone a leaf spring with a upwardly curved center arc portion. Therefore, even if Nickel and Hetmann are combined, they do not contain every element of Claim 6.

Furthermore, one of ordinary skill in the art would not be motivated to combine Nickel and Hetmann to provide a main leaf spring that provides a continuously variable spring deformation rate including a a soft spring rate and a hard spring rate by way of an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having a radii not equal to the first radius and further containing an integral mounting end comprising a mounted eyelet including a metal insert. In fact, there is not suggestion to combine Hetmann with Nickel. Nickel relates to leaf springs and suspensions. Conversely, Hetmann relates to steering linkages. As a result, one of ordinary skill in the art would not be motivated to combine these two references.



Even if Nickel and Hetmann were combined, it would not be obvious to a person of ordinary skill in the art to add the missing element of an upwardly curved central arc portion.

Accordingly, Applicants respectfully request that the Examiner withdraw the rejection of Claim 6.

**b. Dependent Claim 17**

Claim 17 is dependent on Claim 16. Claim 16 is further dependent on Claim 15, which depends on Claim 12. As a result, Claim 17 contains all the elements of Claims 12, 15, and 16. In light of the amendment to Claim 12, Applicant submits that Claim 17 is now allowable.

Accordingly, Applicants respectfully request that the Examiner withdraw this rejection.

**IV. 35 U.S.C. § 103(a)—The Nickel and Wells Patents**

**a. Dependent Claim 11**

The Examiner rejected Claim 11 as being unpatentable over Nickel in view of Wells. Claim 11 is dependent on Claim 10, which is further dependent on Claim 7. Claim 7 is dependent on Claim 1. As a result, Claim 11 discloses a variable rate multi-arc leaf spring. The assembly includes a main leaf spring that is constructed of a composite material. The main leaf spring defines an upwardly curved center arc portion with a first radius and at least one pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to said first radius. The main leaf spring provides a continuous variable spring deformation rate including a soft spring rate and a

hard spring rate. The assembly further comprises a load plate adjacent to said leaf spring, wherein said load plate continuously engages said leaf spring during a predetermined set of payload conditions. The assembly also contains an intermediary member spaced between the leaf spring and the load plate constructed of urethane.

As discussed above, Nickel does not disclose the invention of Claim 1, upon which Claim 11 is based. More specifically, Nickel fails to disclose a main leaf spring including an upwardly curved central arc portion. Nickel discloses a main leaf which has a straight central arc portion.

Wells discloses a leaf spring clamp for securing the position of a leaf spring in a suspension system, including an upper member or clamp base 30 and a lower member or clamp plate 40 for sandwiching a leaf spring between them. (Col. 1, ll. 6-7; Col. 5, ll. 1-4). Wells neither discloses nor suggests modifying Nickel to include a main leaf spring containing an upwardly curved central arc portion having a first radius.

Additionally, Wells does not suggest or disclose a load plate mounted beneath the main leaf spring, wherein the contact length between said main leaf spring and said load plate increasing to achieve an enhanced soft spring rate.

Therefore, Applicants respectfully submit that there is nothing in Nickel or Wells to suggest that it would be desirable to make a main leaf spring defining an upwardly curved central arc portion having a first radius. Furthermore, the references fail to disclose the contact length between said main leaf spring and said load plate increasing to achieve an enhanced soft spring rate.

Moreover, one of ordinary skill in the art would not be motivated to combine Nickel and Wells to provide a main leaf spring that provides an upwardly curved central arc portion having a first radius.

Accordingly, Applicants request that the Examiner withdraw this rejection of dependent Claim 11.

**b. Dependent Claim 21**

The Examiner rejected Claim 21 as being obvious over Nickel in light of Wells. Claim 21 is dependent on Claim 20, which is further dependent on Claim 12, which has been amended in the present response. Therefore, Applicant submits that Claim 21 is as being dependent on allowable Claim 12.

Accordingly, Applicants request that the Examiner withdraw this rejection of dependent Claim 21.

**SUMMARY**

Each pending rejection has been addressed in this response and no new matter has been added. Applicants submit that all of the pending claims are in condition for allowance and notice to this effect is respectfully requested. The Examiner is invited to contact the undersigned attorneys for the Applicants via telephone if such communication would expedite this application.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Adam D. Airhart', written over a horizontal line.

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